

THE LIGHT INFANTRY COMPANY AND TACTICAL MOBILITY: A STEP IN WHICH DIRECTION?

**A MONOGRAPH
BY
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Infantry**



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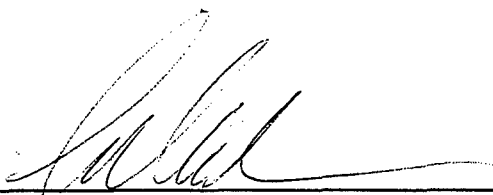
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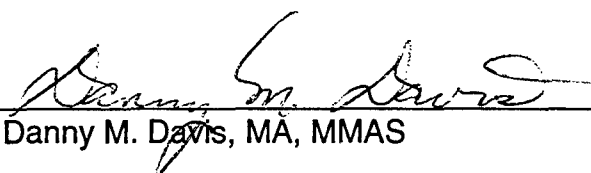
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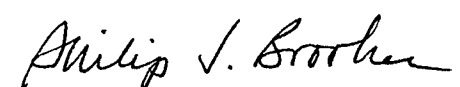
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ABSTRACT

THE LIGHT INFANTRY COMPANY AND TACTICAL MOBILITY: A STEP IN WHICH DIRECTION? By MAJ John M. Spiszer, USA, 70 pages.

The purpose of this monograph is to examine the tactical mobility of the light infantry force and answer the following research question: Based on recent experiences and future anticipated requirements and constraints, does the light infantry company require HMMWVs to provide increased tactical mobility? Focus was on answering the following three questions, ultimately answered positively in the monograph:

- Does the Light Infantry Company need enhanced tactical mobility?
- Does the HMMWV fit the bill?
- At company-level?

The basic arguments presented examine the requirements of the past and future and compare them to the capabilities of the light infantry force of today and tomorrow. This technique seeks to determine if the means, or capabilities, are sufficient to achieve the ends, or requirements. The effort, since it concerns a force development issue, must examine past, present, and future requirements and capabilities to determine if the need for change truly does exist.

The criteria for analysis include: speed and relative mobility, ability to move units and equipment, versatility and agility, force preservation, force structure, cost, and strategic mobility. Operations since 1985, when the first LID stood up, are examined as was the purpose for the LID and its current mobility capabilities. Examination of the future included the impact of the strategic context and evolving U.S. Army doctrine, or Force XXI operations; the latest edition of FM 100-5; and the programmed force modernization of the infantry force, especially Land Warrior.

The author's conclusion is that based on recent experiences and future anticipated requirements, the U.S. Army should assign HMMWVs to light infantry companies to alleviate a serious shortfall in tactical mobility. If undertaken, this move also provides several other benefits examined in the monograph, including lethality, protection, and communications.

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I. Introduction

The mission of the 25th Infantry Division (Light) is to rapidly deploy as a light infantry combined arms force to defeat enemy forces in low intensity conflict and, with mission specific augmentation, fight and win in a mid - high intensity conflict.¹

The current light infantry force has labored under this type of constrained mission statement since its inception. Instead of being able to "close with the enemy by means of fire and maneuver to destroy or capture him, or to repel his assault by fire, close combat, and counterattack"² as in the traditional mission of the infantry, the light force is saddled with qualifying statements. These include: when in restricted terrain, in urban environments, when augmented, in low intensity conflict (LIC), etc. Furthermore, neither mission statement recognizes the plethora of tasks inherent in Operations Other Than War (OOTW). Last, the future promises change which will amplify the impact of these qualifiers and, in fact, make the light infantry a force of insignificance.

One of the largest qualifiers appended to the light infantry force concerns tactical mobility. This impacts the force's ability in conventional operations and OOTW, today and in the future. Based on recent experiences and future anticipated requirements, the U.S. Army should assign High Mobility, Multi-Purpose, Wheeled Vehicles (HMMWVs)³ to light infantry companies to alleviate the serious shortfall in tactical mobility. If undertaken, this move also would provide several other benefits, examined in this paper.

The basic arguments presented here examine the mission requirements of the past and future and compare them to the exhibited or projected capabilities of the light infantry force of today and tomorrow. This technique seeks to determine if the means, or capabilities, are sufficient to achieve the ends, or requirements.⁴ The effort, since it concerns a force development issue, will examine past, present, and future requirements and capabilities to determine if the need for change does exist.

The criteria for analysis includes speed and relative mobility, ability to move units and equipment, versatility and agility, force preservation, force structure, cost, and strategic mobility. The goal is to determine if light infantry companies require additional tactical mobility assets. If so, is the HMMWV the right fix and is the company the right spot?

Problem Background and Significance

U.S. Army light infantry units have been in place since roughly 1985.⁵ Since that time the Army has debated whether the force structure meets the requirements of combat and other operations. The existing light infantry structure is perceived by many as a compromise designed to reduce the manpower, logistics, and strategic mobility requirements of a division. Many sources state that the overriding factor in its development was that the Light Infantry Division (LID) would be deployable in fewer than 500 C-141B lifts and contain no more than 10,000 soldiers.⁶ This creates the current dilemma. Eliminating heavy weapons and vehicles to meet deployability requirements

leaves the light force deficient in firepower, lethality, protection, sustainment, and tactical mobility. Mobility at the company-level is restricted to foot movement, augmented by limited helicopter and truck transportation. At issue is whether any of the current means have met the needs of recent operations or will meet the needs of the future.

The author is interested in the subject since he has dealt extensively with light infantry units in assignments at the Joint Readiness Training Center and with the 25th Infantry Division (Light). In both assignments, tactical mobility was an obvious and ever-present shortcoming at the company-level. The infantry commander never had vehicles during training, but was dependent on them for movement over all but the shortest distances. Once emplaced the company was essentially fixed. On paper the light infantry company has a relative mobility advantage in restricted terrain. In practice, it is virtually immobile. In the author's experience even small numbers of HMMWVs provided vastly expanded tactical mobility, speed, sustainment, troop movement capabilities, and versatility/agility. There were also large improvements in communications, protection through speed, and lethality due to the ability to carry more ammunition and also providing the means to carry heavier weapons.

Future requirements for U.S. Army forces appear to focus increasingly on lethality, survivability, mobility and/or agility, and versatility.⁷ Both technology and force structure requirements are leading us down this path. Current light infantry forces lack the mobility necessary for these future requirements. This

study will attempt to address a pressing need of the past and a probable requirement for the future with a feasible solution in the present.

The amount of attention this issue receives also underlines its significance. The number of studies, articles, and arguments about this issue is impressive. The experiment conducted with the 9th Infantry Division during the last decade was an attempt to come to grips with this issue.⁸ In short, there is an ongoing and continuous debate which seems to be a fertile topic for discussion, but one where the motivation to take action is lacking in the current domestic and strategic environment.

The bottom line is that the twenty percent or more of the active component divisions (see Appendix 1 for a list of units by type in the active and reserve components of the Army) are operationally insignificant due to their inability to move at greater than four kilometers an hour without substantial augmentation.⁹ This is an issue that deserves attention. Any force structure that does not provide benefits greater than its costs is open to question and criticism in this era of reduced defense resources and nebulous threats. Can we afford to keep twenty percent of the force when it has problems at the operational and tactical levels? Should not the U.S. Army take action now, before some peer competitor or other threat emerges which will make us pay for our lack of foresight? Should not the U.S. Army take the lead in addressing this issue before a "solution" is forced on us by outside pressures?

Definitions and Significance

Defining terms is imperative to properly discuss this issue. Of primary importance is tactical mobility. This term is often used and referenced, but is nowhere adequately defined. In the context of this paper, tactical mobility is considered as the definition of mobility at the tactical level of war (see Appendix 2 for doctrinal definitions), or more precisely the mobility of units inside a division's boundary either not in or in enemy contact. The author will focus here on mobility out of enemy contact or upon first making contact. Light infantry forces are physically and mentally conditioned and trained to fight dismounted using speed, stealth, and fire and movement. Fighting mounted requires heavy, possibly tracked, vehicles and a different mindset and tactics than that possessed by light infantry and will not be examined here.

The importance of tactical mobility is largely dependent on the concept of relative mobility which is relational to that of the enemy's.¹⁰ A unit has greater relative mobility if it can move more quickly across similar terrain than can the enemy the unit is opposing. This is a critical capability to possess for combat forces. One that, if properly used, provides an instant advantage over an opponent by allowing the unit to set the terms of battle. However, this advantage has not been evident in many of the operations under examination in this paper, except when using vehicles to enhance mobility.

Next, it is important to define agility and versatility (Appendix 2). Agility is primarily the ability to react faster than the enemy. Versatility is primarily the

ability to meet diverse mission requirements, to move from one operation to the next rapidly, and to have the ability to perform many different types of operations. These two concepts are at the heart of the U.S. Army's operational concept of warfighting¹¹ and are essential characteristics for all forces.

Other criteria include force structure and force preservation. Force structure as a criteria in this paper concerns the issue of whether mobility enhancements, if required, should be assigned, attached, or provided in some other manner. In other words, what is the best way to provide the assets required. Force preservation encompasses light infantry's ability to move, fight, and provide protection. The soldier's load is at the heart of this criteria. The commander's options for handling this load and accomplishing the mission partially defines his ability to preserve his force. Force preservation also includes how he protects his force, a difficult task for the Battle Dress Uniform protected light infantry.

II. Historical Examples

For armies languishing in the somnolence of peace, the critical reading of the lessons of past wars is one of the most fruitful means of seriously preparing for future conflict.... For the infantry arm there are important signposts worth noting.¹²

The purpose of this section is to examine if the requirements, or missions, assigned to the light infantry force in the recent past were met by the force's capabilities, or what capabilities were provided to meet the requirements. It will examine how the U.S. Army's light infantry units performed in actual operations

since 1985, focusing on tactical mobility. The goal is to decide if the light infantry units did or did not require additional assets for tactical mobility.

Why Light Infantry in the U.S. Army

A major and opening premise in the LID *White Paper* of 1984 was that "light infantry divisions must be able to fight -- anytime, anywhere, and against any opponent." These units were required in the force structure to "add a new dimension to the strategic mobility of Army Forces."¹³ Billed as all-purpose, rapid deployment forces by the Chief of Staff of the Army, General Wickham; they were also envisioned as highly trained, if not elite, forces on the Ranger model. The Army hoped to purchase more "bang for the buck" in the areas of manning, equipping, and strategic mobility.

However, the effectiveness of the light infantry force was predicated upon a number of factors or improvements, some of which have never been realized. These factors were in the areas of manning, training, equipping, and sustaining.¹⁴ Below are a few of the shortcomings:

- **Manning:** The LIDs were designed for manning at 100% strength to make up for their austerity; however, this has never been the case. In fact, the manning of the two existing active component LIDs is at the lowest levels for the operational Army. The regimental system was designed to enhance unit readiness and esprit through repetitive tours for officers and noncommissioned officers (NCOs). The officer system, however, stresses a mixed heavy/light

infantry background and the avoidance of repetitive tours. There is little evidence of the system working for the NCOs, either.

- Training: Envisioned as essential in a combined arms environment, most light infantry training is conducted in a pure light infantry environment except at the Combat Training Centers. This is a consequence of the stationing of the LIDs which places them far from other types of units. This makes opportunities for combined arms exercises with other than divisional artillery or aviation units, rare. Small unit training and live fire exercises are generally excellent, but are usually not combined arms exercises.

- Equipping: Lighter equipment was to be the norm, with emphasis on improvements over time. However, either the same equipment is still in use years later, or what changes have occurred have not lightened soldier's loads. Neither foot mobility nor lethality have significantly improved since 1984 and other equipment advantages, other than night vision capabilities, are minimal.

Even prior to the publication of the CSA's *White Paper* in 1984, the role of the light infantry force faced limitations. Emphasis was placed on the force's ability to rapidly deploy its 10,000 soldiers and minimal equipment in less than 500 C-141B sorties. Once deployed, this force could fight other light enemy forces in low- or mid-intensity conflicts.¹⁵ It was a light force designed for specific missions, against specific threats, in specific areas or terrain and not the all-purpose force of the *White Paper*. In fact, the emphasis was primarily on the unit's austerity and strategic mobility.¹⁶ The LID was a cheap "911" force,

especially as the Army fielded its new, heavy equipment¹⁷ to heavier divisions that were much more difficult to deploy to crisis spots around the world.

Current LID Organization¹⁸

The current LID organization has changed little since 1984. In the area of tactical mobility, in fact, the only major change has been to field UH-60 helicopters to replace the older and less capable UH-1 helicopters. While this is a significant improvement, it still provides only 30 UH-60s for lift purposes, meaning less than one infantry battalion is able to fly at one time. Doing so effectively ties up the LID's entire aviation lift logistical capability.

Other assets at the division-level include the Transportation Motor Transport Company in the Main Support Battalion.¹⁹ This unit has the primary mission of moving supplies from the Division Support Area to the Brigade Support Areas. Its secondary mission of moving troops with its 5-ton cargo trucks allows it to move approximately one infantry battalion at a time. Again, this takes the unit entirely away from its primary mission. Assets in the Forward Support Battalion (eleven 5-ton trucks) and infantry brigades (ten 5-ton trucks) are more limited and are specifically tied to other logistics missions, making their use for troop transport difficult and unusual. Last, LIDs have enough lift at infantry battalion-level to move about one company with HMMWVs. This consolidates the entire support platoon and downloads all supplies it carried.

The other "light" divisions, the 82nd and 101st Airborne Divisions, have better mobility. Both contain almost double the amount of HMMWVs at the

infantry battalion-level, primarily in the anti-tank company, and both have trucks; ten in the 82nd (2 1/2-tons) and six in the 101st (5-tons). In addition, the 101st more than triples the number of helicopters, with three battalions of UH-60s and one battalion of the larger CH-47 Chinooks. The Division can lift close to an entire brigade combat team at a time.²⁰

The interesting thing about both these divisions is that despite their obvious enhancements over the LIDs in the areas of tactical, operational, and strategic mobility; their anti-tank capabilities; and for the 101st, improved air lethality, they are in essence just heavier LIDs.²¹ These infantry battalions are recognized as just as capable, just as elite, and just as well-trained to perform the light infantry mission. Yet, they have superior capabilities and versatility. The uniqueness through "soldier power" envisioned for the light infantry force in the 1984 *White Paper* has been achieved in these heavier, "light" divisions of the U.S. Army; divisions which by their nature are more mobile, more agile, and more versatile.

Operation JUST CAUSE

This operation provides perhaps the strongest argument for the LID. It is the one example of light infantry forces fighting a relatively conventional fight; during a non-OOTW mission that is, not to imply that other light units have not fought in other operations. Furthermore, it is a highly successful example of the light forces meeting their requirements with their capabilities. However, there are some caveats to consider.

First,²² elements of the 7th Infantry Division (Light) were already in Panama and conducted their initial assaults against close-in targets requiring little in the way of mobility to arrive in their objective areas. On the other hand, the elements of the 7th ID(L) that deployed from Fort Ord, did so with constrained Division Ready Brigade packages. This meant that each of the light battalions was limited to about ten HMMWVs, or was short 25 vehicles from the start. Once in Panama, the units accomplished most of the actual combat operations using air assaults. Since these missions were relatively small, most used the robust, consolidated aviation task force, with capabilities greatly exceeding that of a LID aviation brigade, for movement. The issue of tactical mobility was solved through the use of helicopters or foot movements over short distances. This was possible because the opponent remained largely immobile in fixed facilities. Light forces did achieve relative mobility in Panama.

Some problems are worth noting, however. For instance, when the light forces did find themselves required to move on the ground they resorted to commercial or confiscated vehicles.²³ One battalion commander termed this technique as “ingenuity and initiative,” but was fortunate to be in a situation where it was possible and permissible.

The whole fight in and through the urban terrain of Panama City highlighted the importance of protection through speed and the tactical mobility inherent in vehicle movements. The M113 Armored Personnel Carriers (APCs) and M551 Sheridan tanks proved invaluable as troop carriers and weapons platforms and

were in constant demand. In addition, the HMMWV proved itself as an effective combat vehicle in urban battle.²⁴ While validating much of the force structure, training, and doctrine related to Army operations and the light force, Operation JUST CAUSE was not a definitive test and did provide food for thought concerning possible future tactical changes and improvements.

Operation DESERT SHIELD/DESERT STORM²⁵

The most interesting aspect of this operation is not how the requirements were met or not met by the units involved, but the fact that the Army made no use of the units under study here. No LID deployed to Saudi Arabia even in the initial stages when rapid deployment with constrained lift was a requirement. Instead the Army went one notch higher, to the 82nd Airborne Division; a more mobile and lethal force than a LID. The 82nd takes a little longer to deploy, but is both more agile and versatile once deployed. Despite this there was still concern at the highest levels over the vulnerability of this "light" force facing a mid- to high-intensity opponent in terrain favoring mobile or maneuver warfare.²⁶

Once the ground war started even the 82nd was given a minor role. No definitive reason is apparent, but the Division's mission consisted of guarding lines of communications and supporting the French 6th Light Armored Division. They followed behind more mobile forces in trucks and/or buses. An airborne insertion was ruled out since "...isolated and relatively immobile once on the ground, the 82d would be difficult to support and sustain from the air alone.

Airborne forces were ill-suited for warfare in open desert, particularly against mobile armored forces."²⁷ The same is even more true for a LID.

Lack of mobility and firepower relegated the 82nd Airborne Division to a secondary role in Operations DESERT SHIELD/DESERT STORM and ensured that the LIDs remained at home station. Although rapidly deployable, neither the light forces nor the 82nd, possessed suitable capabilities to meet the requirements posed in this conflict.

With so much of the force eliminated since the Gulf War it is doubtful if the Army can repeat its performance there without employing more light, "immobile" forces than it did in 1990/1991. Even though these forces were found unsuitable then, they may be required in the future. Can the Army afford to maintain two active component divisions of lesser capabilities? If they have limited utility in one of the two major regional contingencies and possess inferior capabilities to a division that performed a subsidiary role in the Gulf War, then it is difficult to see their relevance or usefulness in an era of expanding missions and decreasing resources.

Operation PROVIDE COMFORT

Unlike Operation DESERT SHIELD/DESERT STORM, this operation provides an example of how even a limited addition in tactical mobility can vastly increase a force's versatility. During this operation the airborne battalion from Italy, the 3rd Battalion, 325th Infantry, deployed to northern Iraq as part of a Joint Task Force (JTF) to provide security and relief to Kurdish refugees. The

“effort involved contingency force intervention” and “had to have a forced entry, and offensive capability.”²⁸ The lessons of this operation are useful both for considerations concerning OOTW and conventional operations due to the nature of the mission and threat.

This battalion, which started with over 150 vehicles, redistributed its vehicles to meet the mission’s requirements. The battalion’s scouts became a forward security detachment and one company became an advanced guard completely mounted on HMMWVs. The remainder of the battalion, or main body, followed in trucks.²⁹ The battalion conducted movements to contact and performed other offensive maneuver tasks. It also covered the large distances involved in establishing a security zone between Iraqi forces and the Kurds. This combination peacekeeping, screen, and humanitarian assistance mission would have been impossible without this tactical mobility. Using organic vehicles required some reorganization, but it was an easy mission since all assets were on hand, to include the skills necessary for their employment. Unit training focused on other necessary tasks, not driving, riding, and convoy skills.

The battalion commander of this unit emphasized that “U.S. forces heading for peacekeeping duties have adequate tactical mobility to operate in the large, often remote sectors that so often characterize such areas.”³⁰ What he did not say, but implied, was that their ease of use was greatly facilitated since the vehicles were organic to his unit. In another article he summarized his unit’s lessons learned for peacekeeping tasks as follows:³¹

- Peacekeeping forces, due to their small size, tend to become responsible for large areas.
- Force protection is usually a high priority. Making peacekeepers non-threatening by lightly arming them must be situation dependent.
- Predeployment training is essential. Any tasks which do not have to be learned [such as the incorporation and employment of attached or augmented transportation assets] saves time for other important training.
- Due to the normally large area of operations assigned to units involved in such operations, extended range communications capabilities are essential.
- Success of humanitarian missions is often dependent on convoy operations and security.
- Helicopters are useful, but cannot replace vehicular assets.
- Force mobility in peacekeeping operations is essential.

In sum, units with vehicular mobility, preferably organic, are better equipped to operate in an OOTW or peacekeeping type operation. The organic vehicles provide versatility, enhanced communications, added force protection, the ability to conduct various types of relief operations, and the familiarity to properly employ the mobility assets. While the airborne battalion's organization does not provide the lethality and mobility for its employment across the full spectrum of operations and terrain, it does add a level of versatility lacking in lighter units.

Operations RESTORE HOPE and UNOSOM II

Operations in Somalia provides another example of light infantrymen, this time from the 10th ID(L), performing combat operations in a low- to mid-intensity environment. This environment included urban and more open terrain. The unit executed both peacekeeping and humanitarian assistance missions. This operation is an excellent example for this study since it covers the gamut of operations faced by light forces. In every case, tactical requirements necessitated unit augmentation with vehicles. This augmentation was mission dependent, and included HMMWVs, 5-ton trucks, and occasionally foreign mechanized vehicles.

The nature of operations in Somalia mandated that the light forces involved improve their tactical mobility. The same conditions noted in Operation PROVIDE COMFORT were also present, including: Large and remote areas of operations, long distances between units, requirements to move equipment and supplies long distances in convoys, the need to find and monitor possible mounted threats ("technicals"), etc.. Due to these conditions and the requirements of the operations, many of the units modified their Mission Essential Task Lists (METLs). Common changes or additions to unit METLs included: Conduct a cordon and search, establish a roadblock/checkpoint, conduct a movement to contact, and conduct convoy operations.³² Nearly all these tasks demanded extra transportation.

For instance, a standard mission was to conduct a cordon and search operation designed to locate, segregate, and search possible threat forces in remote staging areas or while enroute from one location to another. Such an operation relied on both ground and air assets to emplace cordon teams rapidly. In fact, it was the experience of units conducting this type of operation that "HMMWVs are the best ground vehicles for this type of operation.... Their ability to maneuver over rough terrain and to seal the encirclement quickly with mounted infantry was decisive in this operation."³³ The requirements of the mission dictated enhanced tactical mobility which resulted in the augmentation of units with armed HMMWVs and trucks. The units then developed the methods for their employment.

Other typical light force operations were convoys, convoy security, and Quick Reaction Force (QRF). The QRF, mounted on HMMWVs and 5-ton trucks, primarily operated in and around Mogadishu. To accomplish this mission the light infantry units added many vehicles to their company-sized units. QRF vehicles, along with Pakistani tanks and Malaysian APCs, took part in the rescue and recovery operations of the downed Blackhawk helicopter and Ranger company on 3-4 October 1993. HMMWVs were critical in that fight as weapons platforms, troop carriers, ammunition haulers, and ambulances.³⁴

The light forces required substantial augmentation to conduct convoy and convoy security operations. Light battalions were reinforced by up to two truck platoons.³⁵ The ability to move with and protect relief and resupply convoys was

essential and a focus of much of the activity in Somalia. Each unit required the capabilities and experience to conduct this mission.

Not all operations were favorable for wheeled vehicles. First, wheeled vehicles, especially HMMWVs, were particularly vulnerable to mines. In three mine incidents involving HMMWVs, 92% of the passengers became casualties, half fatal.³⁶ In addition, there is a continuing argument in favor of heavy-light capabilities,³⁷ especially in cities, since wheeled vehicles are vulnerable and provide minimal protection for occupants. While wheeled vehicles, especially HMMWVs and 5-ton trucks, were used extensively and successfully by light forces in Somalia, they may not have been the optimal solution. But it is hard to ignore the requirements for tactical mobility and their immense contribution to mission accomplishment, when a typical comment was that "the light infantry has a need for a company of HMMWVs with a combination of .50 calibers and MK-19s for this environment."³⁸

Operation UPHOLD DEMOCRACY

Although not dealing with the huge area or remote operations of Operations PROVIDE COMFORT or RESTORE HOPE/UNOSOM II, this operation included mission requirements which stressed the tactical mobility of light forces. The tactics, techniques, and procedures, as well as the force employed reflected the lessons learned in the earlier operations and modified them to Haitian conditions. The same force used in Somalia, the 10th ID(L), went to Haiti. The unit capitalized on the lessons learned in previous OOTW environments.

Again, HMMWVs and 5-ton trucks,³⁹ were indispensable to operations in Haiti. The mission requirements faced by the light force necessitated vehicle mobility. In this situation “the cargo HMMWV proved itself as the primary work horse for movement and long range patrolling within the light infantry. Like the troop carrier HMMWV the cargo HMMWV proved itself as a good platform for the OOTW environment.”⁴⁰ The 10th ID(L) provided sufficient HMMWVs to its light infantry battalions through redistribution of air defense and field artillery HMMWVs to provide the necessary tactical mobility for transportation, convoy security, cordon and search, and other missions. The air defense and field artillery battalions executed very different missions in Haiti from their primary ones. The field artillery, in particular, configured their tactical operations centers as civil-military operations center facilities.⁴¹ Due to a unique set of circumstances and the experience of past operations, the 10th ID(L) provided the appropriate capabilities to meet the requirements.⁴² Furthermore, the Division trained on the requisite tasks and incorporated the vehicles into operations prior to deployment⁴³ which greatly improved the actual conduct of operations in Haiti.

Other lessons learned about the HMMWV, however, were not so favorable. Problems noted concerning the HMMWV paralleled some of those discovered in Somalia. The vehicle was not designed for troop movements in a tactical environment. The cargo HMMWV did not have any mount for crew served weapons. The weapons of choice, either the Squad Automatic Weapon or the

M-60 Machine Gun were not available in sufficient numbers. Finally, the cargo HMMWV provided no troop protection.⁴⁴ The Army found that the Marine Light Armored Vehicles (LAVs) were exceptionally versatile, provided tactical mobility for the Marine troops, and intimidated street mobs. The major implications were that tracks could have been useful, the HMMWV was largely indispensable, and the best vehicle for the situation in Haiti was the LAV.

In addition to Marines and Army light infantry forces deployed to Haiti, the Army also deployed the 3d Squadron, 2d Armored Cavalry Regiment (ACR) to Operation UPHOLD DEMOCRACY. This force has over double (78 versus 35) the HMMWVs in a squadron as the light infantry does in a battalion. When the Squadron deployed it internally reorganized its transportation assets to meet the requirements in Haiti. These internal assets gave the unit "a significant mobility advantage over other units in the crowded urban sprawl of Port-au-Prince." When utilizing the manpower of their attached light infantry forces, the Squadron was able "to successfully accomplish diverse OOTW tasks."⁴⁵ The combination of the 3d Squadron, 2d ACR and its large numbers of HMMWVs, reinforced with light infantry from the 25th ID(L), provided the ideal force for the mission in Haiti. This force was well suited to meet the requirements of the mission, especially in the area of tactical mobility.

By the time of the redeployment from Haiti, the light forces had learned their tactical mobility lessons well for employment in LIC or OOTW environments. With adequate preparation time and transportation assets, the units deployed

could and did meet the requirements of the mission. But in each case the solutions were makeshift and situation dependent. Commanders cannot count on the same ingenuity, resources, and circumstances in future OOTW or conventional operations. Experience is teaching us that for light forces to succeed in yesterday's and today's environment, enhanced tactical mobility is a requirement, one which may need to be built permanently into the force.

Other Operations

Numerous other OOTW missions further highlight the need for tactical mobility. During the 1992 riots in Los Angeles, the California National Guard and the 7th ID(L) assisted local law enforcement officials. Units executed the following tasks: Escort emergency equipment, provide area patrols/security, transport law enforcement personnel, shows of force, provide VIP escort/protection, provide QRF, conduct joint patrols with local law enforcement, and others.⁴⁶ All of the tasks required some form of vehicular mobility, preferably wheeled in order to minimize maneuver damage in the heavily populated and urbanized Los Angeles metropolis.

Likewise, the task lists for Operation JOINT ENDEAVOR in Bosnia-Herzegovina reflect requirements for vehicular mobility to conduct the peacekeeping mission.⁴⁷ Although currently assigned to a heavy force, the tasks could well fall to a light infantry force in the future.

Another domestic support mission, Operation HURRICANE ANDREW RELIEF, highlights the importance of vehicular mobility. The 10th ID(L)

deployed to Florida as part of a JTF to assist in the clean-up of Dade County, Florida. A large part of the force deployed were the Division's artillery units; considered best suited to meet the requirements of the mission largely due to their greater vehicle density.⁴⁸ Their mobility was increased with internal and external truck support. In this instance the primary unit involved was chosen for its organic mobility capabilities, leading to rapid deployment and employment in an emergency situation.

Bottom Line

The light infantry force has not been used as a strategically mobile, all-purpose force due to its very real limitations in the areas of mobility, lethality, protection, and communications; foremost of which is tactical mobility. Furthermore, the essence of the light infantry, or "soldier power," has yet to be realized or used. When light infantry forces were used it was largely in a subsidiary role or OOTW. The actual missions performed have all been mobility and not manpower intensive.

In each case where light infantry units have been used, they required mobility enhancement to perform their mission. This has either reduced their strategic mobility by requiring the movement of additional trucks and HMMWVs, or has led to additional training requirements or "ad hoc" upon arrival in theater. The force has adapted quickly and well and has learned its lessons from one operation to the next, but continues to require capabilities which it does not normally have and which it is not accustomed to using.

Forces which are heavier and contain larger numbers of vehicles prove more versatile and better able to conduct assigned missions. The 3rd Battalion, 325th Infantry (Airborne) in Operation PROVIDE COMFORT, and the 3rd Squadron, 2nd ACR in Operation UPHOLD DEMOCRACY were substantially better prepared to meet the requirements of their missions with their own organic capabilities than other light forces examined thus far in this study. Although the 10th ID(L) in Haiti was well prepared and organized, this was due to lessons arduously learned and applied from Florida and Somalia. Slightly heavier forces are vastly more versatile than the pure light infantry units.

III. Future Requirements

America's ground forces will have to be prepared to perform the tasks Caesar assigned to his Legions -- win wars, restore order, and preserve a stable and prosperous peace wherever direct American influence is required.⁴⁹

The U.S. Army, and especially its infantry force, must possess the ability to accomplish a wide variety of missions in the future. The potential requirements are almost limitless, but the resources available are not. At the same time, however, technology provides new capabilities. These competing factors require balancing in the force of the future. We must bring these requirements, limitations, and capabilities into focus, especially as they relate to the tactical mobility of the light force. This section examines the evolving strategic context and the emerging U.S. Army doctrine to determine if change is mitigating or aggravating this issue or if the force is already moving toward its solution.

Strategic Context

The military's current and future strategic outlook is a direct descendant of the *Bottom-Up Review* and President Clinton's *National Security Strategy*. Both documents lead directly to the pronouncement of the *National Military Strategy*, published in September 1997. This strategy is one requiring the military to "Shape the international environment and respond to the full spectrum of crises, while we also prepare now for an uncertain future." This strategy consists of two objectives: "Promote peace and stability and, when necessary, to defeat adversaries." Peacetime efforts to "demonstrate our commitment; improve interoperability; reassure allies, friends and coalition partners; promote transparency; convey democratic ideals; deter aggression; and help relieve sources of instability,"⁵⁰ chart a path of OOTW requirements for today's and tomorrow's military. Fighting and winning wars is still the stated principal focus of the military, but is not the major thrust of the NMS. In fact, the absence of any significant threat gives the U.S. "an unprecedented opportunity to shape the future security environment."⁵¹ Many analysts and defense studies believe that such a threat, in the form of a peer competitor, is at least ten to twenty years distant.⁵² Thus, the future will consist of missions similar to those of the past few years. Missions, largely OOTW, covering the spectrum of conflict and requiring forces versatile enough to respond to a myriad of challenges. Missions where light forces are employed needing additional vehicles to meet mobility requirements.

Concurrent with this lack of threat, the military, and especially the Army, is undergoing drastic change. This change is largely captured by a common phrase heard around the Army today: "Do more with less". This means that the Army's operational or contingency deployments are up 300% since the fall of the Berlin Wall, while the Army itself has shrunk drastically. In fact, the Army has reduced over 35% of its people during the same time frame. The last factor is money. While strength has fallen, the Army's budget has decreased even more, down 44% since 1989, and down from 26.2% to 23.2% of the Defense Department's budget.⁵³ In short, the Army has had to "do more with less" and it appears that it will continue to have to "do more with less".

The future holds more of the same. While personnel and budget cuts will probably not be as drastic, they will likely continue due to the persistent emphasis on savings as evidenced by the Quadrennial Defense Review and the Congressional budget debates. There is no discussion reflecting a reversal of this trend. In short, the Army is going to have to continue executing a plethora of contingency and OOTW operations. It must do this with limited funding and a manpower base capped at 495,000, with possible additional cuts, albeit probably small, in the future. The issue was summarized by retired-CSA Carl Vuono:

Conventional forces must be able to meet a wide array of challenges while drawing from a smaller reservoir of forces. Fewer forces and a broad range of challenges mean that each individual unit must be prepared to face a wider spectrum of missions.⁵⁴

Versatility is thus an essential quality for U.S. conventional forces. All forces must be both efficient and effective; able to do many things. The Army cannot

afford to field, equip, and train forces which are not useful "across the full spectrum of requirements, as a member of the joint team effort."⁵⁵ as stated by the current CSA and Secretary of the Army. Specialization of missions for combat units is an unaffordable luxury, except in the most critical of cases such as forced entry and special operations. The smallest and busiest Army the U.S. has fielded since prior to World War II must also be the most versatile.

Emerging U.S. Army Doctrine and Requirements

Emerging trends in warfare point to ever greater and expanding mobility requirements for modern forces. The Army's efforts in defining and developing for the future is encapsulated in the Force XXI process. This process uses the concepts in TRADOC Pamphlet 525-5, *Force XXI Operations*, to provide "focus and direction" for Force XXI. One of the key thrusts of this emerging doctrine is that future battle will occur over an extended battlespace. Due to increased lethality and communications capabilities forces will disperse even more than in the past. U.S. Army forces will need to control the tempo of future operations to keep the enemy off balance and retain the initiative. Last, "versatility will be a key characteristic of future doctrine."⁵⁶ Together, these and the other concepts contained in *Force XXI Operations* point to a force more mobile, quicker, and capable than we have today, especially in the light infantry.

This information-based force is envisioned as inherently more flexible and versatile. It will be a force able to respond across the spectrum of conflict to a variety of threats, while remaining strategically mobile and operationally

effective. Meeting threats by accommodation and innovation must give way to optimized design.⁵⁷ That is the vision; forces will be versatile and will possess the capabilities to meet mission requirements. However, to date the light infantry force has received little attention in the Force XXI future (other than Land Warrior, to be discussed later) and no emphasis on the mobility it requires if it is to conduct the type of operations envisioned in Force XXI.

The final draft of the next Field Manual 100-5, *Operations*, further emphasizes these concepts.⁵⁸ The overall operational concept encompasses seizing the initiative, maintaining momentum, and exploiting success. Controlling the tempo of an operation by operating quicker than an opponent is essential. In addition, all Army forces will, or do, perform certain core functions. One of the primary functions is "move" which requires Army forces to move at a tempo and speed which the enemy cannot match. In short, a large part of the Army's emerging operational concept is dependent on maintaining speed, relative mobility, and controlling the tempo of operations.

U.S. Army Infantry emerging doctrine parallels the overall Army vision and doctrine of the future. Versatility, agility, lethality, and deployability are common themes in official and unofficial publications discussing the future, or Force XXI, infantry force.⁵⁹ The focus for development, however, remains with Land Warrior, owning the night, anti-tank capabilities, and improvements to the Bradley Fighting Vehicle. Recognition of the need for tactical mobility exists, especially as it relates to a dispersed and lethal battlefield, but is not applied to

the light infantry force. This may be a critical mistake since "In wars of the future, there is simply no point in deploying highly trained light infantry without mobility and protection."⁶⁰

Insights from Army Warfighting Experiments (AWEs) indicate the need for greater tactical mobility in the light infantry force. New capabilities, especially JAVELIN, have provided the light infantry an anti-tank lethality it never before possessed. However, the capability is limited since it is tied to the speed of a walking soldier on a fast-paced, mobile battlefield. During the latest AWE, General Hartzog concluded that the JAVELIN "is a winner to the point that light infantrymen were being flown around in helicopters in JAVELIN packages to attack tanks."⁶¹ While it was recognized that JAVELIN is a "winner," what was not recognized was that for its optimum employment it must be able to get to the enemy. Its inclusion in the light infantry force requires additional tactical mobility assets to optimize its use. The broader implication is that as other new systems are fielded tactical mobility requirements will continue to grow in order to get them to the point of decision and/or to move necessary supporting forces to provide for their protection.

This new and developing equipment will make the light infantry a more lethal and capable force, but one with an even greater requirement for tactical mobility. Almost all new equipment will add weight to the individual soldier's and the aggregate company load. The new equipment will broaden the spectrum of

conflict in which the light infantry can fight, if it can get to the point necessary for employment. These new capabilities include the following:⁶²

- **JAVELIN:** Already mentioned above. This new anti-tank missile replaces DRAGON. It is a fire-and-forget, soft-launch, exceptionally accurate, extended range (over 2000 meters) weapon system, which can defeat all known armor. It has proven itself as amazingly effective, providing the light infantry with the capability to defeat enemy armor in a mid-intensity conflict. In addition, this weapon system, if properly supported, could form the backbone of a light infantry unit's ability to delay enemy armored forces, if it is protected and mobile.

However, the new missile, while more capable, is not any lighter. The new system weighs 49.2 pounds, which is heavier than DRAGON.

- **Single Channel Ground and Airborne Radio System:** Already fielded throughout the force, but a good example of what an enhanced capability can do to a soldier's load. Reliable, highly secure radio system which is approximately the same weight as the AN/PRC-77 radio it replaced. However, this new radio cannot handle the digital information flow envisioned for Force XXI and it is heavier as a system. Battery life is approximately 18-20 hours while the old radio's battery life was closer to 72 hours. Thus, four times as many batteries are required for the same length of operation.⁶³

- **M240B Machine Gun (MG):** Replaces the M60 MG and provides nine times the reliability with the same lethal, penetrating, and extended range

ammunition. However, the new weapon weighs four pounds more than the weapon it replaces.

- Combat Identification: Due for fielding in the near future, provides the infantry soldier the ability to designate friend from foe to reduce fratricide.

Weights one and a half pounds.

- Land Warrior: "The Army's revolutionary program to develop and field a totally integrated Soldier Fighting System by the year 2000."⁶⁴ The system consists of an Integrated Helmet Assembly Subsystem, Software Subsystem, Computer/Radio Subsystem, Weapon Subsystem, and Protective Clothing and Individual Equipment Subsystem. The total system is modular and tailorable to mission requirements. Each soldier will have the capability for global positioning, radio communications, computer memory, improved situational awareness, and ultimately greater lethality. The Army is going to begin fielding over 64,000 Land Warrior sets in FY00 to at least all infantry squads. Its development continues in order to lessen its weight, improve performance, and ruggedize it to the conditions of the battlefield.

However, at the current time the backpack, which contains the computer, Global Positioning System, radio, and batteries, weighs eight pounds. Other subsystem items add additional weight to the soldier's load. While the increase is unknown, some of which being offset by the elimination of the carrying of some items, the overall impact will be a significant increase. The new Objective Individual Combat Weapon will weigh approximately 14.1 pounds, much more

than the M16A2 Rifle which it replaces (although it will be a vastly improved weapon system with 20mm high explosive ammunition, thermal sights, etc.). Overall the system adds a large amount of new equipment, as well as resupply requirements, to the light infantry company. While the system, due to its modularity, allows the company commanders and junior leaders to tailor loads to meet the mission's requirements, they will still have the unused equipment which requires moving around the battlefield for future use. The soldier is no longer "light" in a physical sense, making force preservation even more difficult.

Like JAVELIN, the enhanced capabilities will make the individual soldier more lethal. Thus, greater efforts are necessary to get this lethality to the decisive point on the battlefield. Foot mobility while carrying this larger, heavier load, will be inadequate. The ability to move the new infantry soldier system with the subsystems required for the current mission and the anticipated future mission, while keeping track of other components for future use, will become the commander's dilemma in the future. He will have vastly enhanced capabilities limited only by his ability to employ them; the tactical mobility which he controls.

Last, there is a tendency for commanders and staffs to distrust outside units to transport needed supplies and equipment. Thus, it is likely units will overload their soldiers with equipment required for future operations or for unlikely contingencies.⁶⁵ This will continue to degrade the relative mobility of the light infantry to the point of immobility.

Bottom Line:

The strategic situation of the Army requires that all forces be as versatile as possible. In a smaller, more fiscally constrained force which is responding to a greater variety of threats than ever before we cannot afford specialized units available only for limited use.

The infantry force of tomorrow also requires greater versatility to meet anticipated requirements of the future and to become an integral part of the Army's emerging doctrinal concepts embodied by Force XXI. This versatility requires a force able to operate at a greater tempo and dispersed over an extended battlespace. The current relative mobility of elite light infantry forces is insufficient to provide the necessary capabilities.

Infantry equipment of the future requires enhanced tactical mobility for the light force. This mobility is necessary to get the now highly lethal soldier system to the decisive points on the battlefield. This optimizes their employment and also carries the greater soldier's load which is part of the new systems. For the modular and tailorable Land Warrior to be effective, unit leaders must be able to tailor the soldier's load to keep him light on his feet in the dismounted mode and also continue to control the unused components to meet future requirements.

IV. Analysis

This will apply whether he is transported to battle in an MICV [Mechanized Infantry Combat Vehicle] or a helicopter. Mobility is needed most of all in the clash of arms. Swift and agile movement plus rapidity and intelligent tactical flexibility are its true essentials. The link between fear and fatigue having been clearly established

extreme efforts will be required to ensure that the foot soldier is not overloaded.⁶⁶

In examining this issue neither the past nor the future are relevant if they do not lead us to an analysis of what to do now. In this paper the requirements lead us to certain capabilities necessary to meet them. The material already presented has led to tentative conclusions for further analysis here.

Criteria

The first criteria for examination is that of speed and relative mobility. In the past the relative mobility of U.S. Army light infantry in restricted terrain are irrelevant. Dismounted operations in restricted terrain are not the norm, but the aberration. U.S. Army light infantry operations since 1984 have revolved around either the helicopter or the use of "borrowed", attached, or organic vehicular transportation. Only in the initial stages of Operation JUST CAUSE did the light infantry operate solely on foot and then only for limited distances.

It is doubtful if the light infantry can attain relative mobility during combat operations of any duration. The trend is to make the force heavier with new and more equipment. Some progress has been made, but generally speaking the trend of the recent past has been toward heavier equipment.⁶⁷ The future will provide even more equipment. While the new capabilities are impressive and will provide the light infantryman with greater lethality and survivability, they are going to make him slower and tie him down with greater resupply requirements.

Light infantry's reliance on "soldier power" is not, however, tied to a complete lack of vehicular transportation. The 82nd Airborne Division and 101st Airborne (Air Assault) Division both have significantly greater tactical mobility due to a higher vehicle density at the battalion level, yet both rely heavily on what General Wickham defined as "soldier power"... 'the synergistic combination of concerned, competent leaders and well trained soldiers which will make light infantry forces uniquely effective.'"⁶⁸ In other words, the speed and relative mobility of the foot soldier is not what makes the light infantryman unique. He is unique due to his attitude and training,⁶⁹ not his lack of vehicles.

Last, the Army's, and the Infantry community's, focus is not on this issue. Recognition of light infantry's role in the past and the future, its declining relative mobility, the ability to produce units with "soldier power" with or without vehicles, are all topics seldom addressed. The latest issue of *Infantry* magazine, as well as most of the recent briefings and updates on the Infantry force, focus on such things as the M2A3 Bradley Fighting Vehicle, JAVELIN, and Land Warrior.⁷⁰ The speed and relative mobility of the light infantryman is not a concern. Although this must change if the vision of the future force is to be fulfilled.

The second criteria is the movement of units and supplies. Historically, the light battalion's assets have proven inadequate. In some cases this deficiency was made up from other units in the division or from corps assets, or, as in Panama, through the contracting or confiscation of civilian vehicles. Either 5-ton

trucks or HMMWVs appeared adequate for the movement of both troops and supplies, however, the HMMWV was more flexible from a tactical standpoint.

In almost every operation studied the HMMWV receives praise for its ability to provide tactical mobility and enhanced lethality. The operations of cargo HMMWVs with armed HMMWVs provides significant capability. The cargo HMMWV moves an intact light infantry squad of nine men which can rapidly mount and dismount the vehicle. Furthermore, the vehicle can haul from one to two tons of supplies, dependent on the model.⁷¹ While these figures are lower than that for the 2 1/2-ton or 5-ton trucks, the HMMWV was more useful in an overall capacity in most operations studied.

Perhaps the most important criteria to consider are versatility and agility. Throughout the study of the past and future of the light infantry a recurring theme has been the necessity to be both versatile and agile. Agility, one of the continuing essential characteristics of Army operations, which is defined as the ability to react faster than the enemy, is in many ways a mental quality.⁷² However, speed and relative mobility have their place in the physical component of being able to react faster than the enemy. The use of vehicles to enhance this capability is obviously a benefit rather than a disadvantage, especially in allowing a unit to conduct operations in accordance with the Army's doctrine.

In the same way versatility is an essential, doctrinal characteristic, comprising the ability to perform in many roles and environments.⁷³ This capability is also enhanced by vehicular mobility. The ability to do more and

more different types of things seems to be a prerequisite for the Army's force structure in this age of unlimited missions and limited resources.

The versatility and agility inherent in vehicular mobility, particularly the HMMWV, provides the commander with enhanced options, speed, and mobility. The light infantry commander, with HMMWVs, can now conduct delay or screen missions against a heavy force with JAVELIN. He can reposition his reserve and move forces within his sector rapidly to react to threats or a changing situation. He can move his own forces from one sector to the next, independent of outside support. And, last, he is able to conduct a much larger variety of missions from mid-intensity conventional operations to stability and support, or OOTW, operations without augmentation for anything as basic as transportation/mobility.

Force preservation, or in this context the soldier's load, is another criteria of importance, especially to the light soldier. The trend in the Army is toward heavier loads. Overloading severely degrades the soldier.⁷⁴ If the soldier carries too much weight, his performance and mobility will worsen.

While vehicles cannot fix this problem, which is partially a leadership and discipline issue, they do provide the commander the technical means necessary to address the problem at his level. Furthermore, with the increases of equipment forecasted for the Land Warrior system, something is required to provide mobility for the equipment not in use. Additional vehicle support on a permanent basis is necessary due to this issue alone. Last, vehicles also

provide the commander the option to rest soldiers by hauling them, rather than marching them, which saps an infantryman's strength regardless of his load.

If one concludes from the evidence that the light infantry needs vehicles, from where should they get them? The issue is whether mobility assets should be organic or provided on a mission basis. The underlying issue is one of permanency. If a unit only needs certain assets for limited time periods or missions, or if the capability provided is unique, the tendency is to attach or augment the assets to the unit requiring them.⁷⁵ This has been the norm for the light infantry in the past. However, as evidenced by past operations, the mobility requirement appears as a constant.

Two additional and related characteristics of task organization should also be considered. These include cohesion and time.⁷⁶ Attachment or detachment of units has an impact on a unit's performance due to cohesion. A team used to working together is more cohesive and works better together. Time is a related issue. Time is necessary to train a unit to incorporate new capabilities and to build cohesive teams. Both factors are why attachments are habitual if possible, especially for unique capabilities (such as artillery and engineers).

However, transportation is not a unique capability in this sense. Both HMMWVs and 5-ton trucks are already organic to light infantry battalions, in limited numbers. What is now lacking is familiarity in lower echelons of working with and conducting operations using vehicles. Building cohesion and familiarity with techniques and methods takes time which is often unavailable during a

contingency operation. Due to these factors and the constancy of the requirement, additional vehicles should be organic to the light battalion.

On the negative side, however, is the issue of cost. Any increase in the number of vehicles in a light infantry company or battalion will cost upwards of \$50,000 per HMMWV in initial procurement costs⁷⁷, and increase operating costs. There are additional costs in scarce manpower for both drivers and mechanics. More vehicles will require both, since only some of the drivers are available from existing manpower authorizations. On the whole, most driver positions, at company-level at least, will require additional manpower authorizations. Last, with the introduction of more wheeled vehicles to a light infantry battalion, the establishment of an organic maintenance section is a necessity. Some of these possible manpower costs are shown in Appendix 4.

Some of these new costs can be defrayed through the inactivation or shifting of existing assets. For instance, the existing brigade maintenance section would be reduced and split between battalions. In addition, some corps-level truck company assets could be reassigned to the light infantry battalions.⁷⁸ Last, the battalion support platoons will probably require reorganization to make best use of new and existing assets. These efforts will defray some costs, but the net effect is inevitably an increase in dollar and manpower costs both initially and in the future.

Another negative is in strategic mobility. If light infantry units increase the number of vehicles organic to their organization, it will take more planes and

ships to move them (see Appendix 3 for a breakdown of additional airlift required to move vehicles). This increase will significantly impact the utility of a force designed to “add a new dimension to the strategic mobility of Army Forces.”⁷⁹ In fact, the potential increase could be as high as 99 additional C-141 sorties for a LID designed to be moved in approximately 500 such sorties; a 20% increase in lift requirements.

However, there are mitigating factors bearing on this increase. First, strategic lift capabilities have changed since 1984. Strategic airlift is now more efficient, using the C-5 and C-17. Some of the required corps-level units may not require deployment in future contingencies if that capability is contained organically in the LID. Second, the military has made a commitment to preposition substantial amounts of heavy force equipment around the world. Prepositioning light force equipment is a possible option; one of relatively low cost in comparison to that of a heavy force. Last, the versatility and other benefits provided by increased tactical mobility of the light infantry force makes the expenditure of lift assets more than worthwhile.

The argument concerning strategic mobility is highly suppositional anyway. The light infantry force, in every operation since its inception, configured to mission requirements. Every division has both full and constrained deployment packages today. Battalion-level constrained packages include anywhere from zero to ten HMMWVs. Future contingency plans can, and probably will, maintain this constrained package, and others easily modifiable based on the

situation. In short, the unit will deploy with the capability needed to meet its requirements and capped by the available lift. No deployment to date involving light units has been seriously constrained due to airlift.

Discussion of other benefits:

Other added benefits available from vehicle mobility and power are many and too encompassing to be adequately addressed here. However the primary ones include the following:

- **Lethality:** The HMMWV, since it can carry weight the infantryman cannot, can bring greater lethality to the battlefield. The armed HMMWV mounts a variety of weapons from the TOW to the MK-19 grenade launcher.⁸⁰

Furthermore, any vehicle type, through modifications such as a ring mount, can mount a variety of machine guns, if nothing else. They also allow the unit to bring a much greater amount of ammunition to the battlefield.

- **Protection:** Speed, mobility, and lethality all provide the light infantry force with greater security. The enemy's ability to detect and fire at the unit is reduced, thus protecting it from engagement and possible destruction.

- **Communications:** Vehicle powered radios and antennae provide extended range communications. While the dismounted radios carried by the light company have planning ranges of about eight kilometers, vehicle mounted radios range up to 35 kilometers.⁸¹ This enhanced range is especially significant in an OOTW environment in which extended ranges and large areas of operations are the norm rather than the exception. As discussed above, the

vehicle carries more batteries for both the dismounted radios and the Land Warrior system.

Based on this analysis we can now answer the critical questions posed by this paper:

Does the Light Infantry Company need enhanced tactical mobility?

Yes, the light infantry company does need enhanced tactical mobility. This tactical mobility is required for the following reasons:

- Ensure the unit has greater speed and relative mobility than its enemy.
- Ensure that it can conduct Force XXI Operations.
- Preserve the force and allow the commander to tailor soldier's loads.
- Provide versatility in conventional and OOTW missions.
- Provide the additional benefits mentioned above.

Does the HMMWV fit the bill?

Yes, as seen in most past operations, the HMMWV is ideally suited to provide tactical mobility to the light infantry. This is primarily due to the versatility, speed, maneuverability, and other benefits it brings to the battlefield. However, larger trucks, such as the Light Medium Tactical Vehicle (LMTV) or Medium Tactical Vehicle may be needed at battalion-level to provide mobility for more of the battalion (see Appendix 4).

Why at company-level?

First, this is where soldier's load decisions must be made, where the true nature of the required capabilities is determined. This is where confidence is gained in having the equipment under control and ready for future use, thus enhancing the commander's and the unit's flexibility. Second, the OOTW missions of today require versatility at the company-level, versatility best gained through tactical mobility. This versatility translates across the spectrum of conflict, as well. Third, the other benefits, especially in the areas of lethality and communications, available from vehicular mobility are needed at the lowest possible level. The company is where combined arms operations begin, with the platoon and company leaders, their fire support personnel, and engineers. Last, the company plans, prepares for, and conducts the preponderance of training. It is at this level that the soldiers learn how to use and employ the capabilities available to them. If the light infantry is habitually using trucks and HMMWVs on contingency missions it should have the opportunity to train on them at home station.

V. Conclusions

...no soldier need, or should, walk until he actually enters battle.... The fighting soldier should carry nothing into battle except what he wears, his ammunition, his rations, and his toilet articles. When he goes back, he should get new uniform, new underclothes, new everything.⁸²

In short, technology should be tailored to the needs of the light infantry. It should lighten the soldier's load, enhance his mobility, reduce his logistic problems, compensate for his weaknesses,

nullify the enemy's advantages, but never alter the basic nature of the light infantry's attitude of self-reliance.⁸³

Key Findings

The problem with today's light infantry force is that it finds itself in very limited roles due to the current environment and absence of organic tactical mobility. This paper is about making the light infantry force more relevant in the future while still retaining its essential characteristics. The following are the most important findings related to this issue:

- Historically, U.S. Army light infantry forces have not been employed as designed.
- Light infantry forces have always been augmented with vehicles when used. Their primary use has been in stability and support operations.
- The future requires all forces to have maximum versatility and ability to tailor soldier's loads.
- Light infantry units must have greater speed and relative mobility.
- Due to established operating procedures and force modernization the only way to attain speed and relative mobility is to provide vehicles to the light infantry force.
- HMMWVs fill the required capability adequately. They may not be the optimum solution, but they are readily available and they are easily incorporated into light infantry units.
- The capability needs to be organic at the company-level.

Recommendation

Provide all light infantry companies with vehicles to give them the tactical mobility they currently lack. Providing ten HMMWVs to each company will provide the tactical mobility, lethality, protection, and enhanced communications to fulfill most potential mission requirements which the light infantry may face now and over the next ten to twenty years. The result is a more versatile, useful, and relevant force which retains the essence of "lightness".

Recommended Areas for Further Study

This monograph is only the starting point for this issue. It provides the mission need statement on why vehicles are needed in the light infantry company. It does not provide an optimal answer or solution. Because of that here are some recommended areas for further study:

- Compare the HMMWV with other vehicles and organizations to determine which optimally fills the mission need. The first alternative vehicles to consider are the LAV or the Armored Security Vehicle-150.⁸⁴
- How many vehicles are required? At what level of organization? What is the impact on other levels of organization?
- Does the battlefield of the future require greater protection or firepower than envisioned in this paper? What is the impact on these findings?
- Should the light infantry stay the same, but, redefine or change its role in the future to match its capabilities? In other words, can it retain its essence of

'lightness' despite being heavied up to perform more and different missions?

Should it stay the same and accept restrictions on its use?

- Examine mobility just short of contact versus mobility in contact. What is gained? What is lost?

This list is by no means exhaustive. This is a large, complex issue which has been around for a long time. All of the evidence available to this author on the history of the U.S. Army light infantry and the outlook for its future point unequivocally to the need for enhanced tactical mobility. This capability is necessary and easily within the Army's means to provide.

Appendix 1: Unit Breakdowns

Table 1: Active and National Guard (NG) Divisions⁸⁵

Type Division	# Active Divisions	% Active Divisions	# NG Divisions	% NG Divisions	Total	% Total Army
Light Infantry	2	20	1	12.5	3	16.7
Airborne Infantry	1	10			1	5.6
Air Assault Infantry	1	10			1	5.6
Medium Infantry			3	37.5	3	16.7
Heavy	5	50	4	50	50	
Other	1	10			1	5.6
Total	10	100	8	100	18	100

Table 2: Active and Reserve Component (RC) Battalions and Equivalents⁸⁶

Type Battalion	# Active Battalions	% Active Battalions	# RC Battalions	% RC Battalions	Total	% Total Army
Light Infantry	19	16.1	10	7.6	29	11.6
Airborne Infantry	12	10.2			12	4.8
Air Aslt/ TOW Hvy Infantry	11	9.3	32	24.4	43	17.3
Ranger	3	2.5			3	1.2
Mech Inf/ Armor	57	48.3	79	60.3	136	54.6
Hvy/Lt Cavalry	16	13.6	10	7.6	26	10.4
Total	118	100	131	100	249	100

Appendix 2: Definitions⁸⁷

Agility: The ability of friendly forces to act faster than the enemy and is a prerequisite to seizing and holding the initiative. (p. 1-3)

Mobility: A quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfill their primary mission. Those activities that enable a force to move personnel and equipment on the battlefield without delays due to terrain or obstacles. (p. 1-104)

Strategic Mobility: The capability to deploy and sustain military forces worldwide in support of national strategy. (p. 1-145)

Tactical Level of War: The level of war at which battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces. Activities at this level focus on the ordered arrangement and maneuver of combat elements in relation to each other and to the enemy to achieve combat objectives. (p. 1-150)

Versatility: The ability of units to meet diverse mission requirements and for commanders to shift focus, tailor forces, and move from one form or type of operation to another rapidly and efficiently. It is also the ability to be multifunctional and to operate across the full range of military operations. (p. 1-160)

Appendix 3: Strategic Mobility Considerations⁸⁸

	Max # HMMWVs per A/C	Max # 5- ton Trucks per A/C	# A/C to Deploy Co/LID¹	# A/C to Deploy Bn/LID²	Total Additional Sorties Required³
C-130	2	1	5/135	10/90	225
C-141	5	2	2/54	5/45	99
C-17	6	4	2(-)/45	3(-)/23	68
C-5	14	8	1(-)/20	2(-)/12	32

¹ Figures are based on an estimate of ten HMMWVs per light infantry company with 27 such companies in a LID.

² Figures are based on an estimate of ten 5-ton trucks per light infantry battalion with 9 such battalions in a LID and do not incorporate the HMMWVs in the companies from the previous column.

³ These figures are generic numbers of vehicles and planes which do not consider the force packaging which occurs during every contingency mission. Furthermore, this table does not consider possible cross-leveling from current sorties required to move the LID or savings in not moving corps assets which may not have to deploy as a result of the increased divisional mobility.

Appendix 4: Possible Light Infantry Company/Battalion Modifications

Company-level:

- 6 Cargo HMMWVs: One per platoon, one for the antitank section, one for the mortar section, and one for the supply section. This provides the ability to move 54 soldiers at one time, over one third the company, if necessary. This also provides the ability down to platoon-level to tailor the soldier's load and maintain Land Warrior components. Last, these vehicles move the heaviest equipment and ammunition (JAVELIN and mortar rounds) in sections which are always overburdened.⁸⁹
- 3 Armament HMMWVs in the antitank section, to be redesignated as the weapons section⁹⁰. Each HMMWV supplied with a multipurpose mount capable of mounting the company machine guns. Mounts also modified for JAVELIN. Provide the company .50 Cal MGs and MK-19 grenade launchers (three each). Consideration should also be given to bringing back the M40A2 106mm recoilless rifle to introduce a shock effect weapon to the light infantry's capabilities.⁹¹ These weapons for use on these vehicles and on the platoon/company HMMWVs which require modification with some sort of ring mount. This provides lethality and convoy protections capabilities for internal movements and other convoy requirements. This also provides forward security forces and possible delay or screen capabilities.

- 1 Shelter Carrier HMMWV for the company command post (CP) to provide the commander communications and interface capabilities with Land Warrior and provide better than a poncho hooch CP, especially useful in most OOTW situations.
- Total: Ten HMMWVs per light infantry company, all with radios, which provide tactical mobility, lethality, enhanced communications, etc. However, there are insufficient vehicles to eliminate the fact that they are indeed "light" infantry so there will be no danger of the soldiers getting soft and losing their edge.

Battalion-level:

- Consider adding two truck squads to the support platoon consisting of five LMTVs or 5-ton trucks in each squad. This provides the capability to the battalion to mount all of the soldiers, if required.
- Provide the support platoon an additional HMMWV and a maintenance team of five wheeled vehicle mechanics. One mechanic dedicated primarily to each company with the team leader and remaining mechanic dedicated to HHC. This provides the necessary capability to maintain the additional vehicles.
- Total: Ten LMTVs and one HMMWV added to battalion.

Endnotes

¹ *25th Infantry Division (Light) Capabilities Book*. (Schofield Barracks, HI: Headquarters, 25th Infantry Division (Light), 8 February 1993), 1-1.

² Cavezza, Carmen J. *Infantry 2000*. (Fort Benning, GA: United States Army Infantry School, 3 October 1991), 1.

³ The Army should assign HMMWVs, or similar type vehicle to the light infantry. It is beyond the scope of this paper to definitively answer which vehicle is the optimum solution to the light infantry's mobility dilemma. However, the HMMWV, as will be proven, is a good starting place.

⁴ Many instructors at the Army's Command and General Staff Officer's Course in the Center for Tactics are stressing the examination of requirements and capabilities as the true bottom line of the mission analysis process. Requirements (ends/tasks/purposes), or what the unit must do, are balanced against the unit's capabilities, or means. A careful examination of requirements and capabilities provides the unit with its unique problem to solve and bounds the problem for solving, i.e., narrows the potential field of solutions, which is the goal of this paper.

⁵ The development of the light infantry division was an ongoing debate for years prior to 1985, with an actual decision toward the development being documented in the White Paper published in 1984 by the then CSA, General Wickham. This paper led to the transition of the 7th Infantry Division into a Light Infantry Division (LID) which began in 1984, but truly occurred in 1985. John A. Wickham, Jr., *Light Infantry Divisions (White Paper 1984)*. (Washington, D.C.: Headquarters, Department of the Army, 16 April 1984).

⁶ See Gerald E. Thompson, "The Infantry Division (Light): Did We Read the History Book?" Essay (U.S. Army War College, 23 March 1987), 6 and Gerald R. Harkins, "Formation of the Light Infantry." Essay (U.S. Army War College, 21 March 1986), 5, as well as General Wickham's *White Paper* referenced above.

⁷ *Infantry 2000* lists lethality, survivability, agility, and deployability as key capabilities for the twenty-first century infantry force in Section VI. TRADOC Pamphlet 525-5, *Force XXI Operations* (Fort Monroe, VA: Headquarters, U.S. Army Training and Doctrine Command, 1 August 1994), 3-1 lists versatility to function in War and OOTW as a defining characteristic of the Army's Force XXI operations. Dennis J. Reimer and Togo D. West, Jr., *Force of Decision ...Capabilities for the 21st Century (White Paper)* (Washington, D.C.: Headquarters, Department of the Army, 15 April 1996), 25 discusses lethality,

survivability, and tempo as important future capabilities. In addition on p. 6 this paper focuses on "greatly enhanced connectivity, speed, precision, and agility will result in significantly improved lethality, survivability, tempo, versatility, sustainability, and deployability in the force".

⁸ The bibliographical entries attached barely scratch the surface of this debate. Of particular interest are the articles listed from *Infantry* magazine by Thomas R. Rozman and Martin N. Stanton and the studies by Michael J. Clidas, Franklin L. Hagenbeck, Bradley M. Jacobs, John W. Nicholson, and John J. O'Brien.

⁹ The twenty percent figure includes the 25th and 10th Infantry Division's (Light), which are two of the existing ten active component divisions. The reference to possibly more of the force falling into this category brings into question if the 82nd Airborne Division may not also be limited in its operational and tactical significance; an issue which will not be addressed in this paper. The figures do not include National Guard divisions. The issue of operational significance will be highlighted by the author in relation to the past uses of the light infantry force and its versatility. The tactical issue is related to speed, hauling capacity, lethality, and many other issues which will be addressed. The real issue is whether or not the U.S. Army can afford a highly specialized force of limited utility in a resource constrained environment?

¹⁰ Relative mobility, in this context, is applicable in (dismounted) and out (mounted, if on vehicles) of contact with the enemy. It is the ability to get someplace ahead of the enemy and is essential for agility and versatility (see below). See also Field Manual 100-40, *Tactics (Revised Initial Draft)*, (Washington, D.C.: Headquarters, Department of the Army, 7 June 1997), 2-26.

¹¹ Agility and versatility are two of the five Army Tenets of Operations which are set forth in Field Manual 100-5, *Operations* (Washington, D.C.: Headquarters, Department of the Army, 14 June 1993), 2-6 through 2-9 and remain as essential characteristics for the foreseeable future in Field Manual 100-5, *Operations (Final Draft)* (Washington, D.C.: Headquarters, Department of the Army, 5 August 1997), 7-1 through 7-5.

¹² John A. English, *On Infantry* (Westport, CT: Praeger Publishers, 1981), 224.

¹³ Both of these quotes are from Wickham, 1.

¹⁴ *Ibid.*, 3-5.

¹⁵ These issues were hinted at in the Wickham *White Paper*, but were clearly articulated by James J. Lindsay in "The Infantry Division (Light)," *Infantry* 74, no. 1 (1984), 2 and "Infantry Division (Light)," *Infantry* 74, no. 2 (1984), 14.

¹⁶ This austerity and strategic mobility emphasis focused on both manpower and equipment savings as well as strategic mobility plane and ship savings. See Thompson, 6 and Harkins, 5.

¹⁷ This new equipment, a result of years of development, included such important weapon systems as the M1 Abrams Tank, M2 Bradley Fighting Vehicles, AH-64 Apache Helicopters, and the M109A6 Paladin, which make up the backbone of the Army's lethality and firepower in today's Army.

¹⁸ Most LID organization and capabilities presented here are extracted from the *25th Infantry Division (Light) Capabilities Book* (Schofield Barracks, HI: Headquarters, 25th Infantry Division (Light), 8 February 1993).

¹⁹ Transportation capabilities for the LID DISCOM (trucks) are extracted from Student Text 101-6, *G1/G4 Battle Book* (Fort Leavenworth, KS: U.S. Army Command and General Staff College, July 1996), 4-36, 4-39.

²⁰ Information on the structure of the Airborne and Air Assault Divisions comes from Student Text 100-3, *Battle Book* (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1 June 1996), 2-51; Student Handout 7-176, *Infantry Reference Data Book* (Fort Benning, GA: U.S. Army Infantry School, May 1989), 1-2, 2-2, and 4-2; and John W. Nicholson, "America's Middleweight Force: Enhancing the Versatility of the 82nd Airborne Division for the 21st Century," Monograph (School of Advanced Military Studies, U.S. Army Command and General Staff College, 17 December 1993), 40.

²¹ A review of the capabilities and limitations presented in the Command and General Staff College's *Student Text 100-3* (referenced above), pp. 2-33 through 2-36, shows that these units are all essentially light infantry divisions, but that the airborne and air assault type divisions have additional assets for specialized missions and capabilities. In fact, these capabilities probably enhance the unit esprit and enable the unit to more thoroughly capture the essence of "soldier power" envisioned by General Wickham in 1984.

²² Information on 7th ID(L) operations in Panama was extracted largely from Thomas Donnelly, Margaret Roth, and Caleb Baker, *Operation Just Cause: The Storming of Panama* (New York: Lexington Books, 1991), chapters 12 and 16.

²³ David S. Hutchison, "The 3d Battalion 27th Infantry in Operation JUST CAUSE." Monograph (U.S. Army War College, May 1992), 21.

²⁴ Donnelly, chapter 8 and Center for Army Lessons Learned, *Bulletin No. 90-9 Operation JUST CAUSE Lessons Learned: Volume III. Intelligence, Logistics &*

Equipment (Fort Leavenworth, KS: U.S. Army Combined Arms Command, October 1990), III-15.

²⁵ Most of the background information and knowledge concerning Operations DESERT SHIELD/DESERT STORM comes from the Army's official history of this conflict contained in Robert H. Scales, Jr., director, *Certain Victory: The U.S. Army in the Gulf War* (Washington, D.C.: Office of the Chief of Staff, 1993) and from Frank N. Schubert and Theresa L. Kraus, editors, *The Whirlwind War* (Washington, D.C.: U.S. Army Center of Military History, 1995).

²⁶ Both the Chairman of the Joint Chiefs of Staff, General Powell, and the Central Command Commander, General Schwarzkopf were extremely uneasy over the vulnerability of the 82nd Airborne Division's initial deployment to and defense in Saudi Arabia. With little mobility and lethality it had slight hope of stopping Iraq's mechanized forces if they chose to attack even with U.S. air power. See Bob Woodward, *The Commanders* (New York: Simon & Schuster Inc., 1991), 257, 268.

²⁷ Scales, 128.

²⁸ Center for Army Lessons Learned, *Newsletter No. 92-6, Operations Other Than War: Volume I Humanitarian Assistance* (Fort Leavenworth, KS: U.S. Army Combined Arms Command, December 1992), 1.

²⁹ John P. Abizaid, "Lessons for Peacekeepers," *Military Review* 73, no. 3 (1993), 12-14.

³⁰ *Ibid.*, 19.

³¹ The following points, while elaborated elsewhere, are presented by these authors, who are experienced in such operations, in the most compelling and articulate manner researched by the author of this monograph. The points are from John P. Abizaid and John R. Wood, "Preparing for Peacekeeping: Military Training and the Peacekeeping Environment" (Senior Service College Fellowship Program, 10 May 1993), p. 4-11.

³² These METL tasks are presented by Captain Patrick D. McGowan who assisted in their development for the 1st Battalion, 22nd Infantry. Taken from "Operations in Somalia: Changing the Light Infantry Training Focus," *Infantry* 83, no. 6 (1993): 25.

³³ Martin N. Stanton, "Cordon and Search: Lessons Learned in Somalia," *Infantry* 84, no. 6 (1994): 20.

³⁴ For an excellent account of this action, as well as QRF activities and the utility of using HMMWVs, and its lessons learned see Charles P. Ferry, "Mogadishu, October 1993: Personal Account of a Rifle Company XO." *Infantry* 84, no. 5 (1994): 24-30. Captain Ferry stresses the importance of the HMMWVs mounting MK-19 grenade launchers in providing covering and suppressive fires. This issue, the mobility of light infantry in MOUT (as well as mobility over large areas and requiring quick reaction) was addressed in the Lessons Learned Report from UNOSOM II, as well, in Center for Army Lessons Learned, *U.S. Army Operations in Support of UNOSOM II Lessons Learned Report, 4 May 93 - 31 Mar 94 (FOR OFFICIAL USE ONLY)* (Fort Leavenworth, KS: U.S. Army Combined Arms Command, 1994), p. I-4-2 and 3.

³⁵ See Stephen Michael for battalion augmentation requirements in "CSS Operations in Somalia." *Infantry* 84, no. 4 (1994): 30.

³⁶ William C. Schneck, "Vehicle Mine Survivability," *Center for Army Lessons Learned News From the Front* (March-April 1995).

³⁷ For a good summary of this issue see William A. Kendrick, "Peacekeeping Operations in Somalia," *Infantry* 85, no. 3 (1995): 31-35.

³⁸ Phillip Parker, "Somalia Update: Military Operations on Urbanized Terrain (MOUT)," *Center for Army Lessons Learned News From the Front* (December 1993).

³⁹ The augmentation of light infantry units with 5-ton trucks is generally accomplished by attaching a platoon or more of such trucks from a Light-Medium Truck Company found at the Corps Support Command level either in a Corps Support Battalion or Transportation Group. The augmentation of light infantry units with HMMWVs is more problematic since they are not grouped in any easily transferred fashion, being organic to units for other purposes not primarily being the movement of soldiers or tactical mobility. No current organization is designed to provide HMMWV augmentation to the light infantry. Solutions are ad hoc and situation dependent.

⁴⁰ Center for Army Lessons Learned, *Initial Impressions Volume I: Haiti, D-20 to D+40* (Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, December 1994), 114.

⁴¹ The basics on the use of the ADA and FA HMMWVs by the light infantry units came from the Center for Army Lessons Learned, *Initial Impressions Volume II: Haiti, D-20 to D+150* (Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, April 1995), 77. Further information and specifics came from LTC Keith Herring in a conversation with the author on 31 August 1997. LTC Herring was a MAJ in the 10 ID(L) DIVARTY who participated in Operation UPHOLD

DEMOCRACY and was involved in the execution of this use of the artillery's assets by the light infantry. For the first instance of air defense drivers and HMMWVs being attached to the light infantry (in Somalia), see S. L. Arnold and David T. Stahl, "A Power Projection Army in Operations Other Than War," *Parameters* 23, no. 4 (Winter 1993-1994): 21.

⁴² For instance, the Air Defense Battalion's HMMWVs were provided to the light infantry units in Somalia, as well.

⁴³ See the *Initial Impressions Volume I: Haiti, D-20 to D+40*, 3-5, for a discussion of 10th ID(L) predeployment training programs..

⁴⁴ Again see the *Initial Impressions Volume I: Haiti, D-20 to D+40*, 114, 132, and 134 and the *Initial Impressions Volume II: Haiti, D-20 to D+150*, 8 and 10 for discussions on the shortcoming of the HMMWV and the utility of the Marine LAVs in this environment.

⁴⁵ Center for Army Lessons Learned, *Initial Impressions Volume III: Haiti* (Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, July 1995), 106 and 111.

⁴⁶ Tasks extracted from Civil Disturbance Mission Tasking Guidelines found in James D. Delk, "Military Assistance in Los Angeles," *Military Review* 72, no. 9 (1992): 18.

⁴⁷ Required training tasks for forces deployed to Operation JOINT ENDEAVOR are contained in Center for Army Lessons Learned, *Newsletter No 97-1 Tactics, Techniques and Procedures from Operation JOINT ENDEAVOR* (Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, January 1997), Chapter II.

⁴⁸ Information on the field artillery's role in Florida comes from James T. Palmer and Charles R. Rash, "Operation Hurricane Andrew Relief: Humanitarian Assistance, Redleg Style," *Field Artillery* (October 1993): 31-35. General information concerning the 10th ID(L) and its operations in Florida comes from Arnold and Stahl: 4-26.

⁴⁹ Douglas A. Macgregor, *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, CT: Praeger Publishers, 1997), 25.

⁵⁰ John M. Shalikashvili, *National Military Strategy of the United States of America* (Washington, D.C.: Joint Chiefs of Staff, September 1997), 1-2, 7.

⁵¹ *Ibid.*, 8.

⁵² Some studies, such as the Institute for National Strategic Studies, *Project 2025* (Washington, D.C.: National Defense University, 6 November 1991), 26, posit up to 30 or 40 years for the reemergence of a peer competitor, or real threat to U.S. military might. It must also be noted that this study was a major contributor to the results of the Joint Strategy Review of 1993 and thus, also played a role in the thinking behind the *Bottom-Up Review*, and ultimately the current *National Military Strategy*. However, most current writing is of a more cautious nature predicting a possible peer competitor, or at least niche competitors, in the next ten to twenty years. Either way there is minimal head-to-head threat foreseen to the U.S. military in the near- to mid-term. See also "The Future of Warfare," *The Economist* (March 8 - 14, 1997): 24, which does not envision the U.S. losing its large lead in military supremacy anytime soon unless a significant change occurs in the world environment.

⁵³ These facts and figures are taken from a pamphlet published by the Program Analysis and Evaluation Directorate, *America's Army... Projecting Decisive Power Into the 21st Century* (Washington, D.C.: Headquarters, Department of the Army, September 1995), 12. This pamphlet is published and distributed to key DoD and Congressional decisionmakers to ensure they receive the relevant information on how and why the Army has changed since 1989.

⁵⁴ Carl E. Vuono, "Desert Storm and the Future of Conventional Forces," *Foreign Affairs* 70, no. 2 (1991): 58.

⁵⁵ Dennis J. Reimer and Togo D. West, Jr., *Force of Decision ...Capabilities for the 21st Century (White Paper)* (Washington, D.C.: Headquarters, Department of the Army, 15 April 1996), 13.

⁵⁶ The first direct quote is from GEN William W. Hartzog's cover letter to TRADOC Pamphlet 525-5, *Force XXI Operations* (Fort Monroe, VA: Headquarters, U.S. Army Training and Doctrine Command, 1 August 1994). See pages 2-9 for extended battlespace, 3-19 for tempo, and 4-2 for versatility (final direct quote) and Force XXI Operations.

⁵⁷ Paraphrased from Gordon R. Sullivan and Anthony M. Corrales, *Seeing the Elephant: Leading America's Army Into the Twenty-First Century*, (Washington, D.C.: The Institute for Foreign Policy Analysis, 1995), 43.

⁵⁸ Field Manual 100-5, *Operations (Final Draft)* (Washington, D.C.: Headquarters, Department of the Army, 5 August 1997), see 3-1 through 3-3 for the Army's new operational concept and 5-1 through 5-9 for the core functions, specifically 5-8 for Move.

⁵⁹ For a sampling of infantry related emerging doctrine see: Jerry A. White (then the Chief of Infantry), "Light and Lethal," *Infantry* 82, no. 4 (1992): 1-2, and "Tomorrow's Infantry -- A Progress Report," *Infantry* 84, no. 4 (1994): 1-2; Carmen J. Cavezza (also, the then Chief of Infantry), *Infantry 2000* (Fort Benning, GA: United States Army Infantry School, 3 October 1991); John W. Hendrix (again, the then Chief of Infantry), "Infantry Force of the 21st Century," briefing to the Command and General Staff Officer's Course (Fort Leavenworth, KS, 3 April 1996); and Carl F. Ernst (the current Chief of Infantry), "Javelin-The Knockout Punch," *Infantry* 86, no. 5 (1996): 1-2.

⁶⁰ Macgregor, 77. LTC Macgregor makes this point as he argues for the elimination of light infantry units to be replaced by airborne-air assault groups with enhanced operational and tactical mobility. While his focus is on mobility through the helicopter, he has recognized the major weakness of the light infantry force.

⁶¹ General Hartzog is the current Commander of the Training and Doctrine Command. He is quoted here by Jim Caldwell, "TRADOC Commander Reveals Some Results of Force XXI AWE," *TRADOC News Service* (22 April 1997): 29.

⁶² The specifications and capabilities of emerging infantry equipment which follows are from Colonels Robert A. Hobbs (Chief of Infantry Combat Developments) and H. Kinnison (TRADOC Systems Manager - Soldier), "U.S. Army Infantry Center Combat Developments," briefing to the Infantry officers at the Command and General Staff Officer's Course (Fort Leavenworth, KS, 6 August 1997).

⁶³ This information is drawn from extensive personal experience with the SINCGARS Radio which was fielded to the author's light infantry company in 1991.

⁶⁴ This quote and other detailed information on Land Warrior is taken from an information pamphlet by Soldier Systems Command, *Land Warrior: Yesterday, Today, and Tomorrow* (Natick, MA: Soldier Systems Command, 1997). Weights and fielding information is from Hobbs and Kinnison.

⁶⁵ S.L.A. Marshall, *The Soldier's Load and the Mobility of a Nation* (Quantico, VA: Marine Corps Association, 1980), 64 and Charles P. Ferry, "Mogadishu, October 1993: A Company XO's Notes on Lessons Learned," *Infantry* 84, no. 6 (1994): 34.

⁶⁶ English, 223.

⁶⁷ This trend includes such things as the SINCGARS radio (increased battery requirement), already mentioned, the introduction of the Global Positioning System, the new Squad Assault Weapon (increased ammunition load and consumption), etc. New load bearing equipment and rucksacks were developed to make carrying loads easier and resulted in the increase of the weight of the load. The 25th Infantry Division (Light), at least from 1990-1993, only issued medium-sized rucksacks as a conscious effort to make leaders limit loads by ensuring that the soldiers would not have the room to carry more 'stuff'. The new equipment goes the other way by giving the soldier the room for more 'stuff'.

⁶⁸ Wickham, 2.

⁶⁹ Scott R. McMichael, in "A Historical Perspective on Light Infantry," Research Survey No. 6 (Fort Leavenworth, KS: U.S. Army Command and General Staff College, Combat Studies Institute, September 1987), 219-220 presents four primary characteristics that distinguish light infantry forces from regular infantry, including: self-reliance, mastery of their environment, a well developed appreciation for the tactical aspects of terrain, and versatility. In addition, on page 234 he states "Although most light infantry forces are organized light, it is not organization that determines their light nature. It is, instead, their characteristics and methods of operation."

⁷⁰ Both Hendrix and Hobbs and Kinnison are the briefings referenced while the latest *Infantry* magazine is *Infantry* 87, no. 1 (1997).

⁷¹ HMMWV capabilities are from Christopher F. Foss and Terry J. Gander, eds., *Jane's Military Vehicles and Logistics*, 17th ed. (Alexandria, VA: Jane's Information Group Inc., 1996), 439-440.

⁷² Field Manual 100-5, *Operations (Final Draft)* (Washington, D.C.: Headquarters, Department of the Army, 5 August 1997), 7-2.

⁷³ *Ibid.*, 7-5.

⁷⁴ Numerous sources, to include: Field Manual 22-9, *Soldier Performance in Continuous Operations* (Washington, D.C.: Headquarters, Department of the Army, 12 December 1991), 4-3 through 4-4; Scott C. Porter, "The Soldier's Load," *Infantry* 82, no. 3 (1992): 19-22; and virtually all of Marshall's, *The Soldier's Load and the Mobility of a Nation*, is dedicated to this topic.

⁷⁵ See Field Manual 101-5, *Staff Organization and Operations* (Washington, D.C.: Headquarters, Department of the Army, 31 May 1997), F-1 through F-3 for a discussion on the considerations of task organization and Field Manual 101-5-1, *Operational Terms and Graphics* (Washington, D.C.: Headquarters,

Department of the Army, 30 September 1997), 1-13, 1-14, 1-114, and 1-117 for applicable definitions.

⁷⁶ Field Manual 101-5, F-1.

⁷⁷ Cost of the HMMWV is from the Division of Public Affairs, *High Mobility Multipurpose Wheeled Vehicle FactFile* (Washington, D.C.: Headquarters Marine Corps, 29 November 1995), 1.

⁷⁸ While these type of companies (SRC 55719L100) are often attached or in support of light infantry units in order to primarily transport personnel, they also have the mission to move general noncontainerized cargo. Any proposed inactivations in this arena are speculative without a more detailed analysis than is possible here. They are mentioned here since this is a traditional part of the corps slice to a light unit and since they have been used on numerous occasions to primarily transport soldiers. Information on this type of unit is from Student Text 101-6, 3-51.

⁷⁹ Wickham, 1.

⁸⁰ HMMWV capabilities are from Foss and Gander, 439. The HMMWV can also mount the .50 Cal MG, the SAW, the M240B MG, the 106mm Recoilless Rifle, Stinger missiles, and is being tested for a variety of other weapon systems.

⁸¹ Radio ranges are from ST 100-3, 7-13.

⁸² George S. Patton, Jr., *War As I Knew It* (New York: Houghton Mifflin, 1947), 349, 352.

⁸³ McMichael, 231.

⁸⁴ Michael J. Clidas considers this new light armored vehicle's suitability for peace operations in his monograph "Peace Operations: Is There a Need for Wheeled Armored Vehicles?" Monograph (School of Advanced Military Studies, U.S. Army Command and General Staff College, 20 December 1996), 29-31.

⁸⁵ Number of active and National Guard type divisions determined by the author and through discussions with MAJ Ed Maestas, Combat Arms, Army National Guard, Force Structure Branch, Fort Leavenworth, KS on 4 September 1997. Other type division in the active component is the 2nd Infantry Division, which while organized as a mechanized division, includes two air assault battalions.

⁸⁶ Numbers are extracted from the Force Design Directorate, *Requirements Document System: M-Force* (Fort Leavenworth, KS: U.S. Army Training and

Doctrine Command, 29 September 1995). The document lists unit MTOEs with an effective date of 2001. The author, along with MAJ Paul Gootee, Force Design Directorate, extracted the numbers by type battalion on 4 September 1997 and extrapolated backward to the current force to correct obvious discrepancies.

⁸⁷ All definitions on this page come from Chapter 1, Operational Terms, of Field Manual 101-5-1, *Operational Terms and Graphics* (Washington, D.C.: Headquarters, Department of the Army, 30 September 1997). Appropriate page numbers follow each definition in parenthesis.

⁸⁸ Information on the number of vehicles by the types listed in this appendix comes through MAJ Valerie Moore, USAF, Department of Joint and Combined Operations, U.S. Army Command and General Staff College who received the information telephonically from the 436th Aerial Port and Operations Group, Dover Air Force Base (for the C-5), and from the 437th Aerial Port Squadron, Charleston Air Force Base (for the C-130, C-141, and C-17).

⁸⁹ Chadwick W. Storlie also emphasizes the need for a HMMWV to assist the mortar section in "Lightweight Company Mortars: Options for Employment," *Infantry* 83, no. 4 (1993): 4-5.

⁹⁰ See Michael R. Lwin in "The Delta Company: One Commander's Observations," *Infantry* 86, no. 6 (1996): 20-21, where he puts forth the same argument for the Delta companies in the air assault battalions. Changing the antiarmor company (section) to the heavy weapons company (section) recognizes that the unit does (or can do) much more than kill tanks.

⁹¹ Ernest Hoppe discusses this idea in depth in a letter to *Infantry* magazine, "40mm Mk 19 Short of Explosive Power," *Infantry* 87, no. 1 (1997), 4-5.

Bibliography

Books

- Atkinson, Rick. *Crusade: The Untold Story of the Persian Gulf War*. New York: Houghton Mifflin Company, 1993.
- Donnelly, Thomas, Margaret Roth, and Caleb Baker. *Operation Just Cause: The Storming of Panama*. New York: Lexington Books, 1991.
- English, John A. *On Infantry*. Westport, CT: Praeger Publishers, 1981.
- Foss, Christopher F. and Terry J. Gander, ed. *Jane's Military Vehicles and Logistics*, 17th ed. Alexandria, VA: Jane's Information Group Inc., 1996.
- Infantry in Battle*. 2d ed. Washington, D.C.: The Infantry Journal, Inc., 1939.
- Keegan, John. *A History of Warfare*. New York: Alfred A. Knopf, 1993.
- Macgregor, Douglas A. *Breaking the Phalanx: A New Design for Landpower in the 21st Century*. Westport, CT: Praeger Publishers, 1997.
- Marshall, S.L.A. *The Soldier's Load and the Mobility of a Nation*. Quantico, VA: Marine Corps Association, 1980.
- Patton, George S., Jr. *War As I Knew It*. New York: Houghton Mifflin, 1947.
- Romjue, John L. *American Army Doctrine for the Post-Cold War*. Fort Monroe, VA: U.S. Army Training and Doctrine Command, Military History Office, 1997.
- Schubert, Frank N. and Theresa L. Kraus, eds. *The Whirlwind War*. Washington, D.C.: U.S. Army Center of Military History, 1995.
- Sullivan, Gordon R. and Anthony M. Coroalles. *Seeing the Elephant: Leading America's Army Into the Twenty-First Century*. Washington, D.C.: The Institute for Foreign Policy Analysis, 1995.
- Woodward, Bob. *The Commanders*. New York: Simon & Schuster Inc., 1991.

Periodicals and Articles

Abizaid, John P. "Lessons for Peacekeepers." *Military Review* 73, no. 3 (1993): 11-19.

Arnold, S.L. and David T. Stahl. "A Power Projection Army in Operations Other Than War." *Parameters* 23, no. 4 (Winter 1993-1994): 4-26.

Caldwell, Jim. "TRADOC Commander Reveals Some Results of Force XXI AWE." *TRADOC News Service* (22 April 1997): 29-30.

Crowell, Howard G., Jr. and Jared L. Bates. "Heavy-Light Connection: Division." *Infantry* 74, no. 4 (1984): 15-18.

Delk, James D. "Military Assistance in Los Angeles." *Military Review* 72, no. 9 (1992): 13-19.

Ernst, Carl F. "Javelin-The Knockout Punch." *Infantry* 86, no. 5 (1996): 1-2.

Ferry, Charles P. "Mogadishu, October 1993: A Company XO's Notes on Lessons Learned." *Infantry* 84, no. 6 (1994): 31-38.

_____. "Mogadishu, October 1993: Personal Account of a Rifle Company XO." *Infantry* 84, no. 5 (1994): 23-31.

Galvin, John R. "Heavy-Light Forces and the NATO Mission." *Infantry* 74, no. 4 (1984): 10-14.

Hoppe, Ernest. "40mm Mk 19 Short of Explosive Power." *Infantry* 87, no. 1 (1997), 4-5.

"Infantry Division (Light)." *Infantry* 74, no. 2 (1984): 14-16.

Kendrick, William A. "Peacekeeping Operations in Somalia." *Infantry* 85, no. 3 (1995): 31-35.

Lindsay, James J. "The Infantry Division (Light)." *Infantry* 74, no. 1 (1984): 2-3.

Lwin, Michael R. "The Delta Company: One Commander's Observations." *Infantry* 86, no. 6 (1996): 20-21.

McGowan, Patrick D. "Operations in Somalia: Changing the Light Infantry Training Focus." *Infantry* 83, no. 6 (1993): 23-25.

Michael, Stephen. "CSS Operations in Somalia." *Infantry* 84, no. 4 (1994): 29-33.

Naylor, Sean D. "Problem is there's just not enough infantrymen to go around." *Army Times* 57, no. 51 (1997): 14, 22.

Palmer, James T., and Charles R. Rash. "Operation Hurricane Andrew Relief: Humanitarian Assistance, Redleg Style." *Field Artillery* (October 1993): 31-35.

Porter, Scott C. "The Soldier's Load." *Infantry* 82, no. 3 (1992): 19-22.

Rozman, Thomas R. "Thoughts on Medium or Motorized Forces." *Infantry* 81, no. 1 (1991): 22-26.

Stanton, Martin N. "Convoy Security Operations." *Infantry* 84, no. 1 (1994): 10-12.

_____. "Cordon and Search: Lessons Learned in Somalia." *Infantry* 84, no. 6 (1994): 18-21.

_____. "Let's Reorganize the Light Infantry Division." *Infantry* 86, no. 3 (1996): 16-19.

_____. "Letter from Somalia: An S-3's Observations." *Infantry* 85, no. 1 (1995): 13-14.

Stone, Frank J. "Light Battalion Operations at the National Training Center." *Infantry* 85, no. 6 (1995): 36-41.

Storlie, Chadwick W. "Lightweight Company Mortars: Options for Employment." *Infantry* 83, no. 4 (1993): 4-7.

"The Future of Warfare." *The Economist* (March 8 - 14, 1997): 21-24.

White, Jerry A. "Light and Lethal." *Infantry* 82, no. 4 (1992): 1-2.

_____. "Tomorrow's Infantry -- A Progress Report." *Infantry* 84, no. 4 (1994): 1-2.

Wood, Jack B. "Heavy-Light Connection: Brigade." *Infantry* 74, no. 4 (1984): 19-22.

Vuono, Carl E. "Desert Storm and the Future of Conventional Forces." *Foreign Affairs* 70, no. 2 (1991): 49-68.

U.S. Military Field Manuals, Documents, and Briefings

25th Infantry Division (Light) Capabilities Book. Schofield Barracks, HI: Headquarters, 25th Infantry Division (Light), 8 February 1993.

Aspin, Les. *Report on the Bottom-Up Review.* Washington, D.C.: Office of the Secretary of Defense, October 1993.

Cavezza, Carmen J. *Infantry 2000.* Fort Benning, GA: United States Army Infantry School, 3 October 1991.

Center for Army Lessons Learned. *Bosnia Contingency Planning and Training Lessons Learned Report.* Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, December 1995.

Center for Army Lessons Learned. *Bulletin No. 1-88 Light Infantry in Action.* Fort Leavenworth, KS: U.S. Army Combined Arms Training Activity, April 1988.

Center for Army Lessons Learned. *Bulletin No. 90-9 Operation JUST CAUSE Lessons Learned: Volume I. Soldiers and Leadership.* Fort Leavenworth, KS: U.S. Army Combined Arms Command, October 1990.

Center for Army Lessons Learned. *Bulletin No. 90-9 Operation JUST CAUSE Lessons Learned: Volume II. Operations.* Fort Leavenworth, KS: U.S. Army Combined Arms Command, October 1990.

Center for Army Lessons Learned. *Bulletin No. 90-9 Operation JUST CAUSE Lessons Learned: Volume III. Intelligence, Logistics & Equipment.* Fort Leavenworth, KS: U.S. Army Combined Arms Command, October 1990.

Center for Army Lessons Learned. *Initial Impressions Volume I: Haiti, D-20 to D+40.* Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, December 1994.

Center for Army Lessons Learned. *Initial Impressions Volume II: Haiti, D-20 to D+150.* Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, April 1995.

Center for Army Lessons Learned. *Initial Impressions Volume III: Haiti.* Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, July 1995.

Center for Army Lessons Learned. *Newsletter No. 89-2 Heavy-Light Lessons Learned*. Fort Leavenworth, KS: U.S. Army Combined Arms Training Activity, 22 August 1989.

Center for Army Lessons Learned. *Newsletter No. 92-6, Operations Other Than War: Volume I Humanitarian Assistance*. Fort Leavenworth, KS: U.S. Army Combined Arms Command, December 1992.

Center for Army Lessons Learned. *Newsletter No. 93-1 Somalia*. Fort Leavenworth, KS: U.S. Army Combined Arms Command, January 1993.

Center for Army Lessons Learned. *Newsletter No. 94-3 Haiti*. Fort Leavenworth, KS: U.S. Army Combined Arms Command, July 1994.

Center for Army Lessons Learned. *Newsletter No 95-13 Supporting the Peace*. Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, December 1995.

Center for Army Lessons Learned. *Newsletter No 97-1 Tactics, Techniques and Procedures from Operation JOINT ENDEAVOR*. Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, January 1997.

Center for Army Lessons Learned. *Operation RESTORE HOPE Lessons Learned Report, 3 December 1992 - 4 May 1993 (FOR OFFICIAL USE ONLY)*. Fort Leavenworth, KS: U.S. Army Combined Arms Command, 15 November 1993.

Center for Army Lessons Learned. *U.S. Army Operations in Support of UNOSOM II Lessons Learned Report, 4 May 93 - 31 Mar 94 (FOR OFFICIAL USE ONLY)*. Fort Leavenworth, KS: U.S. Army Combined Arms Command, 1994.

Division of Public Affairs, *High Mobility Multipurpose Wheeled Vehicle FactFile* (Washington, D.C.: Headquarters Marine Corps, 29 November 1995

Field Manual 7-98. *Operations in a Low-Intensity Conflict*. Washington, D.C.: Headquarters, Department of the Army, 19 October 1992.

Field Manual 22-9. *Soldier Performance in Continuous Operations*. Washington, D.C.: Headquarters, Department of the Army, 12 December 1991.

Field Manual 7-71. *Light Infantry Company*. Washington, D.C.: Headquarters, Department of the Army, 28 August 1997.

- Field Manual 7-72. *Light Infantry Battalion*. Washington, D.C.: Headquarters, Department of the Army, 16 March 1987.
- Field Manual 100-5. *Operations*. Washington, D.C.: Headquarters, Department of the Army, 14 June 1993.
- Field Manual 100-5. *Operations (Final Draft)*. Washington, D.C.: Headquarters, Department of the Army, 5 August 1997.
- Field Manual 100-19. *Domestic Support Operations*. Washington, D.C.: Headquarters, Department of the Army, 5 December 1990.
- Field Manual 100-20. *Stability and Support Operations (DRAG Version)*. Washington, D.C.: Headquarters, Department of the Army, November 1996.
- Field Manual 100-23. *Peace Operations*. Washington, D.C.: Headquarters, Department of the Army, 30 December 1994.
- Field Manual 100-40. *Tactics (Revised Initial Draft)*. Washington, D.C.: Headquarters, Department of the Army, 7 June 1997.
- Field Manual 101-5. *Staff Organization and Operations*. Washington, D.C.: Headquarters, Department of the Army, 31 May 1997.
- Field Manual 101-5-1. *Operational Terms and Graphics*. Washington, D.C.: Headquarters, Department of the Army, 30 September 1997.
- Field Manual 100-40. *Tactics (Revised Initial Draft)*. Washington, D.C.: Headquarters, Department of the Army, 7 June 1997.
- Force Design Directorate. *Requirements Document System: M-Force*. Fort Leavenworth, KS: U.S. Army Training and Doctrine Command, 29 September 1995.
- Hendrix, John W. "Infantry Force of the 21st Century." Briefing to the Command and General Staff Officer's Course. Fort Leavenworth, KS, 3 April 1996.
- Hobbs, Robert A., and H. Kinnison. "U.S. Army Infantry Center Combat Developments." Briefing to the Infantry officers at the Command and General Staff Officer's Course. Fort Leavenworth, KS, 6 August 1997.
- Hughes, Chris. "Presence Patrols in Haiti." *Center for Army Lessons Learned News From the Front* (January-February 1995).

- Parker, Phillip. "Somalia Update: Military Operations on Urbanized Terrain (MOUT)." *Center for Army Lessons Learned News From the Front* (December 1993).
- Program Analysis and Evaluation Directorate. *America's Army... Projecting Decisive Power Into the 21st Century*. Washington, D.C.: Headquarters, Department of the Army, September 1995.
- Reimer, Dennis J. and Togo D. West, Jr. *Force of Decision ...Capabilities for the 21st Century (White Paper)*. Washington, D.C.: Headquarters, Department of the Army, 15 April 1996.
- Scales, Robert H., Jr. *Certain Victory: The U.S. Army in the Gulf War*. Washington, D.C.: Office of the Chief of Staff, 1993.
- Schneck, William C. "Vehicle Mine Survivability." *Center for Army Lessons Learned News From the Front* (March-April 1995).
- Shalikashvili, John M. *National Military Strategy of the United States of America*. Washington, D.C.: Joint Chiefs of Staff, February 1995.
- _____. *National Military Strategy of the United States of America*. Washington, D.C.: Joint Chiefs of Staff, September 1997.
- Soldier Systems Command. *Land Warrior: Yesterday, Today, and Tomorrow*. Natick, MA: Soldier Systems Command, 1997.
- Sperl, Lou. "Haiti (Operations Uphold Democracy)." *Center for Army Lessons Learned News From the Front* (November-December 1994).
- Student Handout 7-176. *Infantry Reference Data Book*. Fort Benning, GA: U.S. Army Infantry School, May 1989.
- Student Text 100-3. *Battle Book*. Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1 June 1996.
- Student Text 101-6. *G1/G4 Battle Book*. Fort Leavenworth, KS: U.S. Army Command and General Staff College, July 1996.
- TRADOC Pamphlet 525-5. *Force XXI Operations*. Fort Monroe, VA: U.S. Army Training and Doctrine Command, 1 August 1994.
- Wickham, John A., Jr. *Light Infantry Divisions (White Paper 1984)*. Washington, D.C.: Headquarters, Department of the Army, 16 April 1984.

Studies, Monographs, and Dissertations

- Abizaid, John P., and John R. Wood. "Preparing for Peacekeeping: Military Training and the Peacekeeping Environment." Senior Service College Fellowship Program, 10 May 1993.
- Clidas, Michael J. "Peace Operations: Is There a Need for Wheeled Armored Vehicles?" Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 20 December 1996.
- Elam, Richard L. "The Soviet BTR on the Modern European Battlefield: Does It Have a Place in the U.S. Army's Light Infantry?" Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 26 March 1990.
- Ghee, Su Poon. "Equipping the Infantry Division (Light) in the 1990s." Thesis, U.S. Army Command and General Staff College, 9 May 1986.
- Hagenbeck, Franklin L. "The Light Infantry Division: A Case for Greater Robustness in a Downsized Army." Study Project, U.S. Army War College, 8 February 1993.
- Harkins, Gerald R. "Formation of the Light Infantry." Essay. U.S. Army War College, 21 March 1986.
- House, Jonathan M. "Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization." Research Survey No. 2. Fort Leavenworth, KS: U.S. Army Command and General Staff College, Combat Studies Institute, August 1984.
- Hutchison, David S. "The 3d Battalion 27th Infantry in Operation JUST CAUSE." Monograph, U.S. Army War College, May 1992.
- Institute for National Strategic Studies. *Project 2025*. Washington, D.C.: National Defense University, 6 November 1991.
- Jacobs, Bradley M. "Float Like A Butterfly, Sting Like a Bee: Middleweight Units and the U.S. Army." Paper, U.S. Naval War College, 5 May 1995.
- Jacoby, Charles H., Jr. "Light Infantry in AirLand Battle Future: Organizing for Success." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 9 April 1991.

McMichael, Scott R. "A Historical Perspective on Light Infantry." Research Survey No. 6. Fort Leavenworth, KS: U.S. Army Command and General Staff College, Combat Studies Institute, September 1987.

Nicholson, John W. "America's Middleweight Force: Enhancing the Versatility of the 82nd Airborne Division for the 21st Century." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 17 December 1993.

O'Brien, John J. "Size 12 Leather Personnel Carriers: Tactical Mobility and the Light Infantry." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 31 December 1990.

Sutey, William K. "Light Infantry, Augmentation, and the M113A3 Armored Personnel Carrier: A Step in the Direction of Versatility." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 19 December 1992.

Thompson, Gerald E. "The Infantry Division (Light): Did We Read the History Book?" Essay, U.S. Army War College, 23 March 1987.

Van Drie, Mark. "A Light Infantry Division for Airland Battle-Future." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, 26 March 1990.